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## OLDMAN RIVER DAM

## RAPTOR MITIGATION PROGRAM

A Report Prepared For:

GOVERNMENT OF THE PROVINCE OF ALBERTA

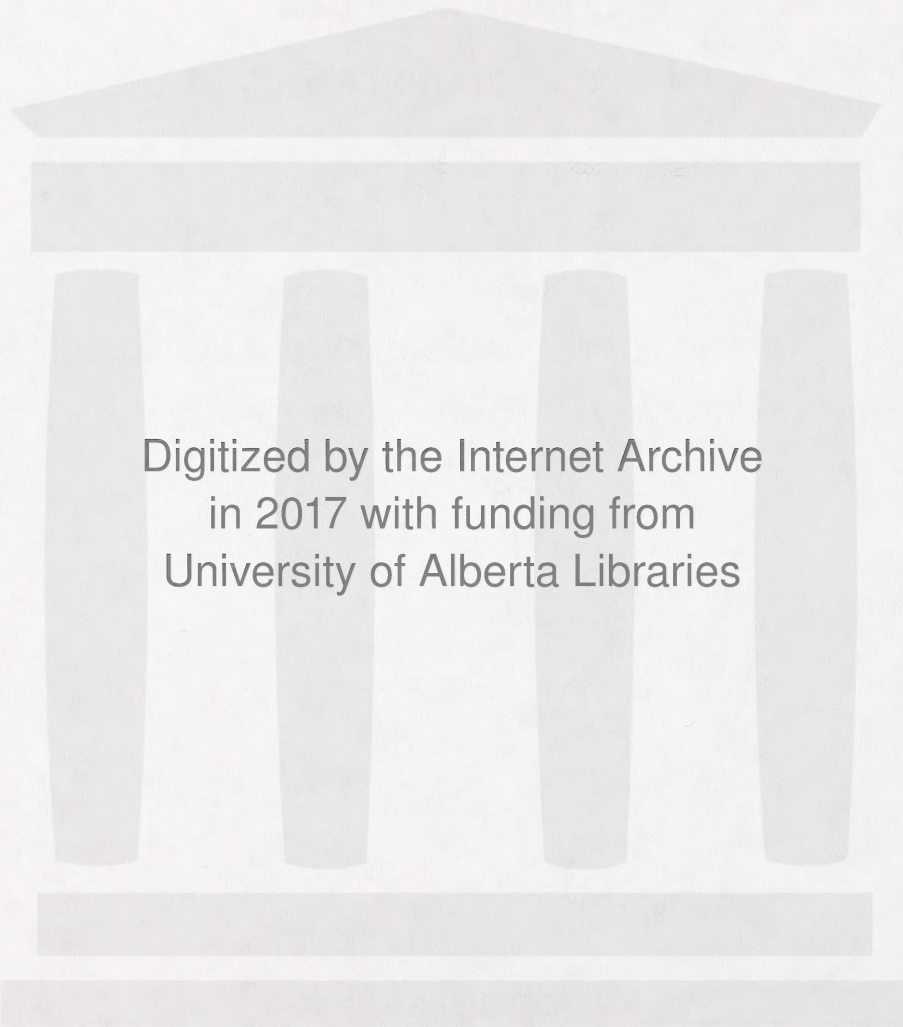
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## EXECUTIVE SUMMARY

This is the third report on the raptor mitigation project which was implemented in response to concerns relative to the impact of the Oldman River Dam on breeding populations of Prairie Falcons *Falco mexicanus* and Ferruginous Hawks *Buteo regalis*. Both species occurring and nesting in areas impacted by the construction and flooding of the dam.

In the current year approximately 425 hours were spent in the field observing these birds. Fourteen Prairie Falcon and two Ferruginous Hawk breeding territories were occupied and monitored during the 1991 breeding season. The two pair of Ferruginous Hawks fledged six young. Nine pair of Prairie Falcons nested, and hatched their eggs, eight pair successfully fledged young with the help of fostering. The flooding of the dam resulted in the loss of two of these nests, however 8 eggs/young were moved from these nests to other nests in the area. The remaining 7 successful nests fledged 31 young, 24 from natural production, and 7 young produced as a result of the fostering from the nests that were flooded. All 31 young Prairie Falcons were caught and banded.

In addition three eggs and one newly hatched chick were collected from two Red-tail Hawk *Buteo jamaicensis* nests. The newly hatched chick died and the eggs were fostered to a wild Red-tail nest. Five young owls were also retrieved from nests flooded by the dam. Four of these were taken to the Coledale Rehabilitation Centre. The fifth was taken to shore and released near the parent bird.

Severe disturbance was documented in two nesting territories in the 1991 breeding season. Both territories were in close proximity to the Dam and were subjected to intense

human and heavy equipment activity. Disturbance in one territory resulted in nest desertion late in incubation. The second territory with severe disturbance is located only about 100 meters downstream of the Dam itself. This territory had been occupied by Prairie Falcons prior to the initiation of construction but has not been successfully occupied since. No falcons have been observed at the site at any time during the past two years. However, in 1991 the territory was successfully occupied by a pair of Great Horned Owls *Bubo virginianus*.

Seven artificial holes were occupied during the 1991 breeding season, four by Prairie Falcons, two by Canada Geese *Branta canadensis* and one by a Great Horned Owl. As in 1989 and 1990 one site was attended by a single male Prairie Falcon who was unsuccessful in courting several females that approached his territory. The remaining three pair of falcons, the Canada Geese and the Great Horned Owls nested successfully.



## 1.0 INTRODUCTION

### Background and Rationale

This is the third year of the project specifically developed to mitigate for breeding Prairie Falcons and Ferruginous Hawks impacted by the construction and/or flooding of the Oldman River Dam. The rationale remains unchanged from that outlined in the 1989 report. The development of a suitable strategy for Mitigation has been predicated on the necessity of understanding the affects of construction and the subsequent flooding on this population of birds of prey. It has therefore been necessary to:

- a) determine the annual breeding population of both species,
- b) where possible document disturbance associated with construction of the dam and its affect on territorial pairs,
- c) individually mark resident birds for future identification, specifically to determine movement and possible relocations associated with the construction and flooding of the dam,
- d) document annual production prior to and subsequent to the completion of the dam.

The two principal limiting factors for birds of prey are an adequate food supply and the availability of suitable nest sites. Consequently in our initial field investigations we looked into the relative significance of these limiting factors in relation to this population of birds. In my opinion it is doubtful that the dam will adversely impact on the availability of prey since field observations indicate that both the Prairie Falcons and the Ferruginous Hawks primarily hunt in the upland at varying distances from the proposed reservoir. In

contrast it was evident that suitable falcon nest sites and nesting habitat in the study area were limited. It was also noted that several of the available sites would be lost and the resident pairs displaced with the flooding of the dam. Initial mitigation has therefore centred on providing suitable alternate nest sites in areas not currently occupied by territorial pairs of these species. Field studies have continued and every attempt has been made to initiate and maintain good public relations and to develop interest and awareness for the long term welfare of these birds.

## 2.0 OBJECTIVES

The principal objective of this project remains unchanged in that we are attempting to minimize possible adverse effects from the construction and subsequent flooding of the Oldman River Dam on the resident populations of Prairie Falcons and Ferruginous Hawks. To achieve this objective we have monitored the effects of disturbance on the two species for the past three years and have implemented mitigation procedures which we believe will minimize the impact on these populations.

Additional specific objectives were described in the original contract #Fyfe 89-01 and are as follows:

- a) To provide supervisory services relative to the construction of raptor nesting sites,
- b) To supervise the tagging and identification of raptors during the year,
- c) To maintain a photographic (slide) record of the project,
- d) To observe and record the movement of raptors during the courtship period and over the summer, and,



- e) To provide a report at the end of the year.

### 3.0 METHODS

#### 3.1 FIELD OBSERVATIONS:

##### 3.1.1 Inventory of Breeding Pairs

As detailed in my 1989 and 1990 reports the initial raptor inventories relative to the Oldman River Dam were carried out as part of the Oldman River Wildlife Investigations in the spring and summer of 1985. These inventories located four breeding pair of Prairie Falcons and one pair of Ferruginous Hawks within the proposed reservoir boundaries. Three additional pair of falcons and two pair of Ferruginous Hawks were located upstream and downstream of the proposed reservoir. (Young et al. March 86). Further inventories of breeding pairs within the proposed reservoir were carried out in 1986 and again in 1987. These inventories were somewhat cursory in that they were of short duration, their timing precluded the collection of data on the establishment of territories and the surveys were restricted to nests located within 1.6 km of construction related activity (Young, 1988).

A more comprehensive inventory was required in order to determine the total population, the affects of construction and flooding of the dam, and to locate potential alternate breeding locations. Therefore raptor breeding inventories and behavioral studies have been carried out from March through July in 1989, 1990 and 1991. These field investigations were carried out specifically to locate breeding pairs, non breeding pairs and individuals occupying known breeding territories, or suitable nesting habitat within 16 km. of the proposed reservoir boundaries.



### 3.1.2 Banding and Colour Marking

In order to verify the effects of the construction and/or flooding of the dam on the resident Prairie Falcons and Ferruginous Hawks, it was deemed necessary to be able to distinguish residents from migrants or transients of the same species. Since most individuals of both species are virtually identical in size and colour, it was necessary to catch individuals and mark them with an external marking device which could be identified later. Following considerable discussion we received permission from both the Alberta Fish and Wildlife Branch and the Canadian Wildlife Service Banding Office to use standard USF&W numbered aluminum bands together with combinations of red, blue and black coloured bands on Prairie Falcons for the study area. Since they were to be most directly affected by the construction and flooding color marking was restricted to Prairie Falcons. The single pair of Ferruginous Hawks identified in the area of the proposed reservoir were found to have relocated outside of the area and none of the Ferruginous pairs currently nesting in the study area will be displaced by activities related to the construction and/or flooding of the dam.

### 3.1.3 Disturbance

One of the objectives of the current study has been to determine the effects of disturbance resulting from the construction and flooding of the dam on both Prairie Falcons and Ferruginous Hawks. This is of particular relevance as earlier studies have documented adverse affects on these two species resulting from various types of disturbance (Fyfe and Olendorff 1976, Call 1978, White and Thurow 1985, Grier and Fyfe 1987). From the

beginning it has been evident that since several of the Prairie Falcon and Ferruginous Hawk nesting territories encompass areas that are impacted by or adjacent to the dam, it is inevitable that resident birds will be disturbed to a greater or lesser degree by activities associated with construction and/or flooding. Therefore all observed instances of disturbance and the subsequent behaviour were documented during the 1989, 1990 and 1991 breeding seasons.

#### 3.1.4 Artificial Nest Construction

As indicated in the 1990 report one Ferruginous and eight Prairie Falcon nesting territories will be adversely impacted as a result of dam construction and/or flooding. Following the flooding of the reservoir, seven of the eight pair of falcons will be displaced permanently since the nesting habitat previously utilized will no longer be available. It is expected that the remaining pair of falcons which formerly nested at the dam site will return to nest in its original territory following construction when human activity immediately beneath and adjacent to the site has abated.

Field observations and the good production in each of the past three years suggest that foraging areas and the availability of an adequate prey base are not limiting factors at this time. Therefore as outlined in earlier reports our mitigation has been directed towards providing suitable alternate nesting sites. In 1989 and 1990 following the breeding season an ambitious program of nest site construction and modification was undertaken in and adjacent to the proposed reservoir. For the most part, these sites are situated near existing territories and will not be directly impacted by the flooding of the reservoir. As a result of

this mitigative action, I believe the availability of suitable nest sites should no longer be a limiting factor. As a consequence those birds displaced as a result of construction and/or flooding will have alternate unused nesting sites available for occupancy.

Although surveys indicated that there would be no shortage of trees to provide suitable nest sites for the relocation of Red-tailed Hawks or other stick nesting raptors, it was decided to provide artificial nest platforms as potential alternate nest sites adjacent to the reservoir. We believe that these platforms will not only provide sites for any surplus buteos in the area, but may also be used by Canada Geese and at the same time serve to attract Osprey *Pandion haliaetus* and Bald Eagle *Haliaeetus leucocephalus* to the reservoir. The decision was also made to provide suitable nest boxes for displaced American Kestrels *Falco sparverius* and other hole nesting species, including tree nesting waterfowl such as Wood Duck *Aix sponsa*, Hooded Merganser *Lophodytes cucullatus*, Bufflehead *Bucephala albeola* and Goldeneye *Bucephala islandica* observed in the study area.

## 4.0 RESULTS

### 4.1 Population inventory

Prairie Falcons were observed in fourteen of seventeen documented nesting territories during the 1991 breeding season with no new nesting territories identified. One site was again occupied by a single male with two females utilizing separate nest sites within that male's territory. As in 1990 a single male once again held a territory at Stevick's and tried unsuccessfully to attract and hold a female in the territory. Prairie falcons did not



attempt to nest at three known territories and no falcons were observed near the nest sites in these territories during the breeding season.

The initial flooding of the dam in 1991 eliminated six nesting sites and nesting habitat that had been used one or more times during the past three years. Three additional sites will be lost in the spring of 1992 when the dam is flooded to capacity.

Ferruginous Hawks were observed in three nesting territories outside of limits of the proposed reservoir but within the study area. Two of these pair occupied territories and produced young during the current year, the third territory was occupied briefly by a lone male and then deserted. One additional pair was observed several kilometres to the east of the study area. It should also be noted that Ferruginous hawks have not been observed at any time during this study in the area of (Fer #17) as described by Young et al. (1986).

#### 4.1.1 Prairie Falcon Production

Despite the very cold and wet spring 31 young Prairie Falcons were produced by eight productive pair (Table 1) for an average of 3.87 young per productive pair, or an average of 2.58 young for twelve nesting attempts. In 1991 only one territory was documented where a single male was observed mating with two females which resulted in two nesting attempts, only one of which was successful in fledging young. As in the two previous years in this territory the second female deserted during incubation.

TABLE 1. PRAIRIE FALCON BREEDING TERRITORIES

1989, 1990, 1991

NEST SITE	PRS	IND	COURT	COP	EGGS	YNG FL
	89 90 91	89 90 91	89 90 91	89 90 91	89 90 91	88 90 91
Old Bridge	Y Y Y		Y Y	Y Y Y	5	4 4 5
Mercury	Y Y Y		Y Y		4 4	4 3
Dam <sup>1</sup>	Y		Y			
Buffalo Jump E.	Y Y Y		Y Y Y	Y		4 5 4
Buffalo Jump W. W. <sup>2</sup>	Y Y Y		Y Y Y	Y Y Y	3	
Fairbrother	Y Y Y		Y		5	3 3 3
Bitango Eagle	Y		Y			4
Bitango Bridge	Y Y		Y			5
Tennessee Creek	Y Y	Y			4	4 4
Lang	Y Y Y		Y Y	Y	3	1 5
Welsch	Y Y Y		Y		4	4 4
Days	Y Y		Y	Y	5	2
1st Porcupine <sup>R</sup>	Y Y		Y Y	Y		5 4
Double Ox-bow	Y Y	Y	Y		Y <sup>1</sup>	
Horseshoe Canyon	Y Y Y		Y	Y	5 4	4 4 3
Horseshoe Canyon <sup>2</sup>	Y	Y				2 2
Maloff	Y Y Y		Y Y	Y	4	3 4
Stevick		Y Y Y				
Castle Dairy	Y Y Y		Y	Y	5 5	4 4 4

<sup>1</sup> suspected relocation from former #42<sup>2</sup> second nest site within an established territory<sup>R</sup> pair relocated from Days<sup>1</sup> female observed incubating

NEST SITE = Names given to known breeding territories

PRS = pairs observed on territory

IND = individual birds observed to remain in a territory

COURT = courtship behaviour observed

COP = copulation observed

EGGS = number observed, most nests not climbed in incubation

YNG FL = number of young known to have fledged

#### 4.1.2 Ferruginous Hawk Production

Six young were produced at the two nest sites located outside of the proposed reservoir. At both nests, all of the young were just about to fledge when the nests were visited. As in 1990 the two light phased adults near the highway produced two light phase young whereas the pair at the edge of the Porcupine Hills (a dark phase male and light phase female) produced two dark phase and two light phase young. Early in the spring a lone male bird was observed at 1st Porcupine. He remained in the territory for a short period but failed to attract a female and left the area.

**TABLE 2. FERRUGINOUS HAWK BREEDING TERRITORIES**

1989, 1990, 1991

NEST SITE	PRS	IND	COURT	COP	EGGS	YNG FL
	89 90 91	89 90 91	89 90 91	89 90 91	89 90 91	88 90 91
Feedlot	Y	Y		Y		
Highway	Y Y Y		Y			3 2 2
1st Porcupine	Y Y	Y	Y	Y		
Porcupine #2	Y Y					3 4

NEST SITE = Names given to known breeding territories

PRS = pairs observed on territory

IND = individual birds observed to remain in a territory

COURT = courtship behaviour observed

COP = copulation observed

EGGS = number observed, most nests not climbed in incubation

YNG FL = number of young known to have fledged



## 4.2 Banding and Colour Marking

As a result of discussions with Mr. Nilson of Alberta Dept of Public Works and Mr. Erickson and Mr. Rhodes of Alberta Forestry, Lands and Wildlife it was agreed that whereas we would again band the young prairie falcons no attempt would be made to trap and band adult falcons in 1991. Also, as the project is to be terminated in 1992 it was felt that the young should only be banded with regular aluminum bands as they would not be expected to form part of the 1992 breeding population.

Thirty one nestling Prairie Falcons were captured and banded using regular USF&W lock on bands (Table 3). This brings the total to one hundred and twenty eight Prairie Falcons that have been banded in the past three years with ninety seven colour marked. The total includes the nineteen adults caught and individually marked. All were banded with numbered USF&W bands and those that were colour marked were also given one or more coloured anodized aluminum bands. Young birds in the two previous years were banded with a single colour band coded as to the year of production. Since the young will not be part of the breeding cohort prior to the flooding of the dam they are marked only so that at some later date it is possible to determine if recruitment is from this population unit.

The primary objective of the banding is to help us to locate and identify individuals that move or are displaced. However, since it is not always possible to catch the breeding birds, each adult bird that we have caught has been specifically colour marked so that individuals can be identified in the field by the use of a spotting scope. Incidental to our

regular field observations this year we were able to identify eight of the breeding adults by reading the band colour combinations.

TABLE 3. 1991 IMMATURE PRAIRIE FALCON BANDING

Location	Male	Female	Date
Old Bridge	816-34374 816-34375 816-34376 816-34377	987-24184	06-12-91
Buffalo Jump East	816-34378 816-34379	987-24185 987-24186	06-12-91
Castle Dairy	816-34380 816-34381 816-34382 816-34383 816-34384	987-24187	06-18-91
Maloff	816-34385 816-34386	987-24188 987-24189	06-18-91
Fairbrothers		987-24190 987-24191 987-24192 987-24193 987-24194 987-24195	06-18-91
1st Porcupine	816-34387 816-34388	987-24196 987-24197 987-24198 987-24200	06-18-91

It should be noted that it was originally proposed that Ferruginous Hawks nesting within the boundaries of the proposed reservoir would also be individually marked. Unfortunately no Ferruginous have been color marked as none have nested within the boundaries of the reservoir in the past three years. However, each year they have nested in

the study area and this year the young of the two pair breeding in the study area were banded for future reference.

#### 4.3 Disturbance

All of the breeding pairs of both species in the study area were subject to a wide range of natural disturbance and varying degrees of human related disturbance. During the current breeding season, human disturbance was greatly decreased at most of the nesting territories and with the completion of the dam, construction related disturbance was pretty much limited to those nest sites near the reservoir and to a couple of areas on the upper end of the flooded area of the dam on the Castle River.

In general, in comparison to the previous two years the incidence of disturbance to breeding pairs of Prairie Falcons was greatly reduced. Our observations suggest moderate to severe disturbance was restricted to four nesting territories.

Of these, two sites were subjected to moderate disturbance for relatively short periods of time. The first occurrence was at the Maloff territory on April 23 when two hunters began shooting gophers opposite the nesting cliff. The incubating female vacated the area while the shooting was going on but returned later to incubate and was successful in hatching and fledging her young. Similarly a short term disturbance was documented at the Castle Dairy territory when men and heavy equipment were observed working for several days in succession at approximately five to six hundred meters and directly across the river from the nest.



TABLE 4. PRODUCTIVITY AND DISTURBANCE AT KNOWN PRAIRIE  
FALCON BREEDING TERRITORIES FOR 1991

NEST SITE	1985 NEST # ( Young et al. 1986	PRODUCTIVE IN 1991	DISTURBANCE
Old Bridge	#48	Y	Minimal
Mercury	#45	N	Severe
Dam <sup>1</sup>	#42	not occupied	Severe
Buffalo Jump E.	#40	Y	Minimal
Buffalo Jump W. <sup>2</sup>		N	Minimal
Fairbrother		Y	Minimal
Bitango Eagle		not occupied	Minimal
Bitango Bridge	#37	not occupied	Minimal
Tennessee Creek		Y	Minimal
Lang		N	Minimal
Welsch	#22	N	Minimal
Days		not occupied	Minimal
1st Porcupine <sup>R</sup>		Y	Minimal
Double Ox-bow	#18	N	Minimal
Horseshoe Canyon	#15	Y	Minimal
Horseshoe Canyon <sup>2</sup>		not occupied	Minimal
Maloff	#12	Y	Moderate
Stevick		not occupied	Minimal
Castle Dairy		Y	Moderate

<sup>1</sup> suspected relocation from former #42

<sup>2</sup> second nest site within an established territory

<sup>R</sup> pair relocated from Days

NEST SITE = Names given to known breeding territories

# = Corresponds to nest numbers given in earlier reports by Young

PRODUCTIVE = Indicates whether a nest site was productive or not in the 1990 breeding season.

DISTURBANCE = relative level of documented disturbance

from the nest site. This disturbance was in late May well into incubation and had little or no apparent affect on the falcons.

Severe disturbance was documented at the remaining two sites which were both in close association with the final construction at the Dam site. Unfortunately at one of these sites we recorded the third nest desertion associated with the construction of the Dam and directly related to human disturbance. This occurred at the Mercury Nest Site on May 10, 1991 as a direct result of human activity. At 09:10 a caterpillar with a blade was observed moving rocks and earth directly in front and below the nest. The female Prairie Falcon from the nest was circling and calling directly overhead. The operator was observed out of the cab for extended periods of time. I was advised that this activity continued for a period of approximately four hours. Apparently the female had been frightened from the nest and then remained in the vicinity for a couple of hours. By 09:45 she had departed from the area. When we returned the following morning the eggs were gone and there was no sign of the falcons. The pair subsequently deserted the area and we did not observe them at the site nor in the territory for the remainder of the 1991 breeding season.

The territory immediately to the south of the Dam was the second area where a high level of disturbance was recorded. As in the past three years intense activity of heavy equipment and workmen were observed almost daily in and near this territory. This activity during the past three years appears to have resulted in at least the temporary desertion of this site by the Prairie Falcons. However, this year as in 1989, the territory was occupied by a pair of Great Horned Owls. These birds utilized an old raven nest and were successful despite the incredible amount of activity in the area.

Two additional Prairie Falcon nest desertions were recorded in 1991. The first occurred early in incubation when one of the two females stopped incubating in the Buffalo Jump territory. Similar behaviour and nest desertion was exhibited by the second female in this territory in both the 1989, and 1990 breeding seasons. The second desertion occurred at the Welsch site. On June 20 four to five week old young were observed in this nest site, yet when visited for banding on June 22 the nest was found to be empty.

Ferruginous Hawks were observed at all three of the previously occupied territories in the study area this spring. Pairs were observed at the Highway and Porcupine #2 territories whereas a lone male returned to the 1st Porcupine territory and failed to attract a female. The remaining two pair in the study area were both successful during the 1991 breeding season. As in the past three years the Ferruginous in the study area have been subjected to little human interference and our observations suggest that their production has not been influenced by disturbance.

TABLE 5. PRODUCTIVITY AND DISTURBANCE AT KNOWN FERRUGINOUS BREEDING TERRITORIES FOR 1989, 1990,1991					
NEST SITE	1985 NEST #	NEST SUCCESS			DISTURBANCE
		1989	1990	1991	
Feedlot		not occupied			Minimal
Highway <sup>1</sup>	#47	Y	Y	Y	Minimal
Porcupine Hill		N	N		Minimal
Porcupine #2		Y	Y	Y	Minimal

<sup>1</sup> suspected relocation from former #42

<sup>2</sup> second nest site within an established territory

NEST SITE = Names given to known breeding territories

# = Corresponds to nest numbers given in earlier reports by Young et al 1986

NEST SUCCESS = Indicates whether a nest site was productive or not

DISTURBANCE = relative level of documented disturbance



#### 4.4 Artificial Nest Utilization

Seven artificial holes were occupied during the 1991 breeding season, four by Prairie Falcons, two by Canada Geese and one by a Great Horned Owl. As in 1989 and 1990 one site was attended by a single male Prairie Falcon who was unsuccessful in courting several females that approached his territory. The remaining three pair of falcons, the Canada Geese and the Great Horned Owls nested successfully.

Prior to the 1991 breeding season nineteen nest platforms were constructed and placed on tree stumps in selected sites along the banks of the reservoir or on newly created islands( Appendix. 4). Although none of the platforms were utilized for nesting in 1991, two pair of Red-Tailed Hawks were observed utilizing the platforms as hunting perches and initial courtship was observed at one of the sites.

Although we were not able to make a serious attempt at monitoring all of the nest boxes we did document Kestrel pairs at five of them.

### **5.0 DISCUSSION**

#### **5.1 Prairie Falcons**

Thirteen territorial pair of Prairie Falcons were located in the study area during the 1991 breeding season. Production was excellent for the productive pairs despite the usual adverse spring weather, and the extensive manipulation required as a result of the flooding of the reservoir and the loss of one nest to predation. The resulting fledging success of 3.87 young (Table 1) per successful pair of Prairie Falcons is actually up from previous years and well above what is normally considered good fledging success ( 3.1 or 3.2 per successful pair as reported in Idaho by Ogden and Hornocker (1977) and the Pawnee Grassland in Colorado by Olendorff (1973)).

As in previous years the large number of breeding pairs together with the excellent production and high number of the successful pairs suggests an excellent food supply is readily available to these birds. I also believe that the documentation of another territory where a single male mated with two females is further evidence of an abundant food supply. As indicated in earlier reports this is a rare phenomena since shared incubation and food gathering appears to be critical in the success of a breeding pair (Holthuijzen, 1989). I can only suggest that since food exchanges are an important courtship ritual the ready availability of food must have contributed to the courtship and mating of a single male with two females.

## **5.2 Ferruginous Hawks**

In 1985 a single pair of Ferruginous hawks was recorded nesting in the area to be impacted by construction activity. After relocating twice, this pair has nested successfully each year since 1989 at a site approximately four kilometers from the dam. Ferruginous have also been recorded at three different locations within the study area, two of these pair have nested and the third pair courted but made no nesting attempt.

In each of the three years of the study heavy snow and rain have made field work difficult and at times impossible. Such weather also appears to play a major role in the success or lack of success of the nesting Ferruginous. In both 1989 and 1990 we documented nest desertions by incubating Ferruginous following spring storms with heavy snowfall. This was unexpected, yet we have no other explanation and the timing seems more than coincidental. I believe these desertions probably occurred as the result of the exposed nature of the nests which in turn are an artifact of the nesting habitat available to the birds.

In the 1991 field season Ferruginous Hawks were observed in three nesting territories outside of limits of the proposed reservoir but within the study area. Two pair occupied territories and produced six young during the current year, the third territory was occupied briefly by a lone male and then deserted. One additional pair was observed several kilometres to the east of the study area.

As noted in earlier reports, other field studies suggest that Ferruginous Hawks are much less tolerant of human disturbance than the Prairie Falcon (White and Thurow 1985, Fyfe and Olendorff 1976). The relocation of the one pair of Ferruginous in 1988 would tend to support this observation. Fortunately our observations during this study indicate that the three pair of Ferruginous Hawks within the study area have been subjected to a minimum of human disturbance. We have found no evidence to suggest that human interference has in any way affected the production of these birds during the past three years.

### **5.3 Manipulation**

Nest manipulations were first tested and used successfully by the Canadian Wildlife Service in the Peregrine Recovery Program. Since much of the experimental work was carried out with Prairie Falcons we were satisfied that the techniques could be applied to the rescue efforts that would be required as a result of the flooding of the Dam.

At the time of flooding the number of pairs of breeding Prairie Falcons in the study area had declined to nine pairs still occupying territories. We had anticipated that five or six Prairie Falcon nests would be flooded with the initial filling of the dam. However, no falcons nested at either the Bitango Eagle or the Bitango Cliff site this year, only one site



was occupied in Horseshoe Canyon, and the pair at Lang's failed after two nesting attempts. Consequently we only had to salvage pipping eggs from the pair nesting in Tennessee Coulee and the young from the single nest in Horseshoe Canyon. We were able to foster the young falcons fairly easily to other active nests with young of similar development.

However, all of the relocations were not totally straightforward as the flooding of the nest sites came at the worst possible time for some of the nesting falcons and Red-tailed Hawks. Specifically the flooding happened to coincide with the hatching of the eggs in the Prairie Falcon and Red-tail nests in the Tennessee Coulee. Although the timing of nesting in the remaining pairs of falcons was staggered, after climbing to six eyries on the day of the flooding we were not able to locate a suitable nest with pipping eggs. As a result we had to locate someone with a brooding chicken to incubate the eggs until we were able to locate a suitable nest. On the following morning the last available eyrie proved to be a suitable site with only two of five eggs hatched. We therefore put the pipping eggs into this nest with her remaining three eggs. The two young that had hatched were taken to another eyrie. Two of the young from Horseshoe were then taken from here and placed in still another nest site.

As noted we also collected eggs from two Red-tailed Hawk nests and the young from three Great-horned Owl nests. Some of the Red-tail eggs were pipping when we collected them and unfortunately a newly hatched chick died (probably as a result of chilling). The three remaining Red-tail eggs were placed in a nest where the female was incubating two eggs of her own. The four young from the first two owl nests were taken to the Raptor Rehabilitation Centre in Coledale for later release. The remaining young owl was close to fledging and after being rescued from the water it was released on land near its parent.

The manipulation of the eggs and/or young Prairie Falcons, Red-tailed Hawks and Great Horned Owls was successful despite the inopportune timing. None of the fostered eggs or young were rejected by the adoptive parents and the percentage of hatching and fledging would be considered normal.

The results of the manipulations were as follows:

### **Prairie Falcons**

1. - 7 pipping eggs under the female at Castle Dairy

(3 of her own, 4 from Tennessee)

Result- 6 young banded and fledged

2. - 6 (1-3 day old) young at Fairbrother's eyrie

(3 of her own, 2 from Castle, 1 from Horseshoe)

Result - 6 young banded and fledged

3. - 6 (3-5 day old) young at 1st Porcupine eyrie

(4 of her own, 2 from Horseshoe)

Result - 6 young banded and fledged

### **Red-tail Hawks**

1. - As indicated the three remaining Red-tail eggs were placed in a single nest with two eggs of her own.

Result - 4 young hatched, 3 young fledged

### **Great Horned Owls**

1. - 4 young collected and taken to Coledale
2. - 1 young released with parent

## 5.4 Disturbance

In the 1989 report I suggested that next to the actual destruction of nest sites by flooding, the most serious problem for both the Prairie Falcon and the Ferruginous Hawks would probably be the incredible amount of disturbance resulting from the construction of the dam and roads, as well as from clearing and other habitat modification.

During the past three years we have taken every opportunity to document any disturbance that could be associated with the development of the Dam. We did not attempt to stop such disturbance when it was encountered nor to interfere with ongoing construction or activities. Our observations of the activities and the subsequent results were simply documented and reported. In general our observations demonstrate that the Prairie Falcons documented in this study are remarkably adaptable and tolerant to some types of disturbance. Indeed the most remarkable aspect of the field study has been the tolerance of the Prairie Falcons to the many types of disturbance. These birds frequently demonstrated tolerance levels to human activity far in excess to anything I had previously witnessed. We were able to document instances where breeding birds habituated to such activities as the close approach of people in boats, daily heavy equipment and vehicle activity to within 50 meters of the nest and exposed humans working at roughly 300 meters from nest sites for extended periods of time. In brief, our observations indicate that Prairie Falcons can be habituated to a wide variety of human activities and will tolerate incredible levels of disturbance.

However, we also documented three instances where falcons deserted nesting territories and occupied nests apparently as a direct result of human activity. Two of these



desertions occurred early in the breeding cycle prior to actual nesting. However the most significant desertion was documented late in incubation in May of this year. The pair that deserted were occupying the nest site located directly across the river from the Oldman River Dam Construction Camp. Since the beginning of the construction of the Dam this pair of falcons has tolerated a continuing high level of disturbance. They have been subjected to a wide variety of human activity and have nested successfully in each of the past two years. However in May of this year as a direct result of close intrusion by both heavy equipment and human activity the pair deserted their nest, eggs and territory late in incubation.

As stated, we have documented the three desertions described above during the past three years. In my opinion these came about directly as a result of people and/or heavy equipment approaching to within 20 meters of the nest sites and remaining in the area for extended periods of time. I believe that with suitable guidelines and coordination with contractors such losses could be avoided. Just such an example occurred in 1990 with the successful intervention and cooperation at the Welsch site. Following a meeting with the contractor the work was carried out meeting specific timing concerns relative to the welfare of this particular pair of birds. The construction work was completed successfully and the birds returned to mate and nest successfully. I believe that realistic guidelines must be in place in the future if such desertions are to be avoided. As indicated in my 1990 report these observations parallel those made in the recent study in Idaho by Holthuijzen (1989) . On the strength of the data I think that realistic recommendations can and should be drafted relative to the potential effects of construction activities on breeding Prairie Falcons.

We do not have any comparable data for Ferruginous hawks and I therefore suggest that until shown otherwise the best approach with this species is that it be treated as ultra sensitive to human interference.

### **5.5 Artificial Nest sites**

Since the existing nesting territories were still intact at the beginning of the breeding season the majority of the breeding pairs including those utilizing artificial holes remained in their original territories. No new pairs were located in new nesting territories in 1991.

A total of seven artificial holes were occupied during the current breeding season, four by Prairie Falcons, two by Canada Geese and one by a Great Horned Owl. As in 1989 and 1990 one site was attended by a single male Prairie Falcon who was unsuccessful in courting several females that approached his territory.

As noted in the 1990 report, suitable alternate nest sites are now available for most of the breeding pairs. The exception being the Bitango and Tennessee Creek nesting territories. As there were no alternatives, marginal habitat was selected and with permission from the land owners, two new sites were created near Tennessee Creek and a third, south of the highway on a cliff adjacent to Pincher Creek. Unfortunately this means that good alternate nest sites are limited within reasonable proximity of three sites flooded in 1991.

Nineteen nest platforms were constructed and placed on tree stumps in selected sites along the banks of the reservoir or on newly created islands ( Appendix. 4). These were put out to provide suitable nest sites for the relocation of Red-tailed Hawks or other stick nesting raptors. We believe that these platforms will provide sites for any surplus buteos in

the area, they may also be used as nest sites by Canada Geese and at the same time serve to attract Osprey and Bald Eagle to the reservoir. Although none of the platforms were utilized for nesting in 1991, two pair of Red-Tailed Hawks were observed utilizing the platforms as hunting perches and initial courtship was observed at one of the sites.

Wooden nest boxes were also put out adjacent to the reservoir to provide suitable nest boxes for displaced American Kestrels and other hole nesting species, including tree nesting waterfowl such as Wood Duck, Hooded Merganser, Bufflehead and Goldeneye observed in the study area. Although we did not make a serious attempt in the 1991 breeding season to monitoring all of the nest boxes that were put out we did document Kestrel pairs at five of them. As a result of this immediate success additional boxes are going to be put out prior to the 1992 nesting season.



## 6.0 RECOMMENDATIONS

1. Consideration should be given to a continued monitoring of the effect of recreational activities on birds of prey, colonial birds and other designated species for three to five years following the completion reservoir. We should be cognizant that following flooding of the reservoir the majority of the breeding pairs of prairie falcons and several other species will be subjected to increased interaction with humans. I suggest that the department should capitalize on the accumulated data on this population of birds. These data provide the basis to: a) evaluate the effects of disturbance,

b) to understand habituation, and

c) to contribute to realistic guidelines for future construction and recreational projects.

In the light of the increased environmental concern by the public and environmental groups I believe that this is a unique opportunity to develop realistic guidelines for mitigating problems associated with such projects in the future.

2. Where possible, it would be desirable to coordinate planned recreational activities to minimize disturbance and maximize the recreation and educational potential of the breeding raptors and colonial species.

3. Consideration should be given to drafting guidelines and realistic recommendations relative to the effects of construction and related disturbance on Prairie Falcons. Our

observations indicate that with a few exceptions, these birds are very tolerant of a wide variety of disturbances. Our findings support and parallel those made in the recent study in Idaho by Holthuijzen (1989). On the strength of these data, I think that realistic recommendations can be drafted relative to the potential effects of construction activities on breeding Prairie Falcons.

4. I recommend the establishment of an observation shelter and information board in one of the recreational areas or just opposite the Mercury site, where the public can observe the Prairie Falcons through spotting scopes. This should be manned by a summer student or retired biologist.

5. I recommend the establishment of information centres and/or displays in Pincher Creek, Cowley, and Public Lookout to inform the public of the raptor and wildlife mitigation work that is being carried out in association with the dam.

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## Appendix 1.

## Summary of Oldman Prairie Falcon Nest Data

Old Bridge Nest Site. #48(Young et al.,1986)

**OLD BRIDGE**  
1968 - 1991

YEAR	PAIR	INDIV	EGGS	YNG	FLEDGE	BAND AD	BAND YNG
1968	YES		3				
1969	YES		2				
1970	GHO						
1971	YES		5	5	5		
1972	YES		5				5
1973	YES		5	4	4		4
1974							
1975							
1976							
1977							
1985	YES						
1986	YES						
1987	YES						
1989		YES					
1990	YES			4	4	mTr,fTr	4
1991	YES			5	5		5

## History

This is one of the original nest sites documented in the late 1960's and monitored by CWS through the early 1980's. The nest was reported to be occupied in 1986 and 1987 (Young, 1988)



### 1989 Breeding Season

April 7, - A female was first observed doing courtship flying on April 7. One week later a pair were present and copulation was observed opposite the most easterly nest hole. From April 14 through May 22, falcons were observed on several occasions but there was no evidence of a nest attempt. When we attempted to trap the birds they were totally indifferent and simply left the area.

#### Disturbance

Trucks and men walking at the river edge were observed April 1 roughly 100m from the nest site and on the opposite side of the river. The back hoe arrived the next day and intensive activity was still ongoing April 7 with men active and clearly visible around the pumping station that had been set up. When I returned on April 14 the intensive activity appeared to have ceased and the pump house apparently is now only visited for short periods, apparently on a daily basis.

#### Results

No serious attempt was made to nest in 1989, possibly as a result of unacceptable disturbance during the initiation of the breeding cycle.

### 1990 Breeding Season

The female was first observed sitting in a tree opposite the cliff on March 6 and was observed at each visit to the site in March. On April 24 both birds were observed the male perched in the trees opposite the cliffs and the female in one of the improved nest ledges. She appears to be incubating. One or more birds were observed at pretty well every visit in May and one was always on the nest. June 5 the female was perched opposite and at least three 3wk-old young were observed in the nest. On seeing me the female flew over and cacked. On June 18 four young were banded and both adults were trapped. The female was unbanded and the male was found to be the male that nested at Mercury in 1989.

#### Disturbance

Trucks and men walking at the river edge were observed early in March roughly 100m from the nest site and on the opposite side of the river. The activity apparently was limited to a couple of days merely setting up the pumping station. I did not observe the back-hoe. Men were observed rotovating straw into silt in the trees about 200M from the nest after the female was already incubating. They were there for three or four days and the female appeared to ignore them. Except for brief daily visits to check the pump there was little or no disturbance for the rest of the breeding season.

Results - 4 young fledged, both adults trapped

### 1991 Breeding Season

The female was first observed on March 18, and again on April 8th. On both occasions she was observed on one of the tree perches used in previous years. On April 12 the female was already on the nest laying or incubating. One week later the female was definitely incubating and the male was perched in one of the favourite perch points in the trees opposite the nest site. A few days later the female was observed incubating and she was identified as the last years female by her bands when she stood up. On May 20 when the female flushed, five two week old young were observed in the nest. Nine days later the pair were cacking aggressively even though we were on the opposite side of the river from the nest. The five young appear to be about three weeks of age. Both adults were present on each of five visits to the territory in June. On June 12 the five young were banded with USF&W bands as follows: 987-24184 female

816-34374 male

816-34375 male

816-34376 male

816-34377 male

The young fledged on June 20.

### Disturbance

Disturbance was minimal in 1991. Other than our visits to the opposite side of the river and our one visit to the nest site for banding I am not aware of any other human interference or disturbance.

Results - five young fledged and banded

**Mercury Nest Site - #45 (Young et al., 1986)**

### History

This is one of the original nest sites documented in 1968 and monitored by CWS through the early 1980's. It is named "Mercury" because this nest had the highest level of mercury contamination of any Prairie Falcon nest sites sampled in Alberta in 1968. The nest was reported to be occupied in 1986 and 1987 (Young, 1988).

### 1989 Breeding Season

A pair of birds on territory

March 9 and observed repeatedly throughout the remainder of the breeding season. The female was first observed incubating on April 14 and the first small young observed May 22. Both adults were trapped and banded on that day. Four young were banded June 19 and all four were fledged and observed perched near the site on July 6.

## Disturbance

This pair is clearly habituated to the activity associated with the camp which is approximately 1km to the north on the opposite side of the river. They do not pay any attention to moving vehicles on the road a mere 150m away on the opposite side of the river, nor do they react to the presence or activity of the heavy equipment moving on or in

**MERCURY EYRIE**  
1968 - 1991

YEAR	PAIR	INDIV	EGGS	YOUNG	FLEDGE	BAND AD	BAND YOUNG
1968	YES		5	1			
1969	YES						
1970	YES		5	3	3		3
1971		YES					
1972							
1973	YES		5	5	5		5
1974							
1975	YES		5	5	5		5
1976	YES		5	5	5		5
1977	YES						
1978	YES						
1980	YES						
1985	YES						
1986	YES			4	4		
1987	YES			3	3		
1989	YES			4	4	mTR,fTr	4
1990	YES			3	3		3
1991	YES		3?				

association with the rock pile that is adjacent to the nest site. The first indication of disturbance was observed in April when fisheries biologists began



### **Mercury Nest Site -(continued)**

working on the river in front of the nest. The birds were clearly agitated and flew overhead cackling continuously. However, the pair did not desert even though this activity continued for a few hours most days. My last observation of the fisheries biologists was made on May 2 with the female incubating. The only other major disturbance that was observed was on May 22 when some heavy equipment became stuck on the riverbank opposite the nest. Several additional pieces of equipment came to assist and several men were observed walking around the equipment. The birds appeared to have little concern other than to watch the proceedings.

Results - 4 young were fledged

### 1990 Breeding Season

A pair of birds on territory March 6 and observed repeatedly throughout the remainder of the breeding season. The female was first observed incubating on April 24 and still appeared to be brooding on June 11. Three young were banded June 21 and two were observed sitting in trees on July 11. The male was seldom observed at this site during the entire breeding season yet was present at banding and the young were successfully fledged.

### **Disturbance**

As in previous years this pair is clearly habituated to the activity associated with the camp which is approximately 1km to the north on the opposite side of the river. They do not pay any attention to moving vehicles on the road a mere 150m away on the opposite side of the river, nor do they react to the presence or activity of the heavy equipment moving on or in association with the rock pile that is adjacent to the nest site. As in 1989 the first indication of disturbance was observed in April when fisheries biologists began working on the river in front of the nest. The birds were clearly agitated and flew overhead cackling continuously. However, the pair did not desert. It is possible that the repeated absence of the male was due to his lack of tolerance for disturbance.

Results - 3 young fledged

### 1991 Breeding Season

The female was observed perched about 15m away from the nest ledge on March 18th. She was also observed at the ledge on several occasions in early April. The male was observed only once perched some distance from the nest. Similar behaviour to 1990? By April 8 the female appeared to be either laying or incubating. Heavy equipment was working about 200m away and the fisheries biologists were on the river daily at this time. On April 21 the female was positively identified by her bands. She was observed incubating then and again on several occasions up to May 9. On May 10 severe disturbance resulted in the desertion of the nest site.

## Disturbance:

As noted above sever disturbance apparently resulted in the desertion of this nest site. My notes are as follows:

At 09:10 a caterpillar with a blade was observed moving rocks and earth directly in front and below the nest. The female Prairie Falcon from the nest was circling and calling directly overhead. The operator was observed out of the cab for extended periods of time. I was advised that this activity continued for a period of approximately four hours. Apparently the female had been frightened from the nest and then remained in the vicinity for a couple of hours. By 09:45 she had departed from the area. When we returned the following morning the eggs were gone and there was no sign of the falcons. The pair subsequently deserted the area and we did not observe them at the site nor in the territory for the remainder of the 1991 breeding season.

Results - nest deserted

**Dam Nest Site** - Powerline Site (CWS files), #42 (Young et

## History

This is one of the original nest sites documented in 1970 and monitored by CWS through the early 1980's. The territory was reported to be occupied by a single adult in 1986. (Young,1986)  
al.,1986)

## 1989 Breeding season

On March 24 first a single female then the pair was observed perched on the cliff opposite the original nest site. The female was observed sitting briefly in the artificial hole on the northeast side of the cliff. Courtship activity and nest displays observed on March 30 on the same cliff. The birds were then observed departing from the cliff during a period of intense disturbance on March 30. They were present on the following two mornings only to depart when the workmen arrived. No birds were observed again until a single female was observed on the cliff April 14. No further observations were made of birds at this cliff.

**DAM EYRIE**  
**1970 -1991**

YEAR	PAIR	INDIV	EGGS	YOUNG	FLEDGE	BAND AD	BAND YOUNG
1970	YES		2				
1971	YES		4	2	2		2
1972							
1973							
1974	YES		4	4	4	1TR,	4
1975							
1976							
1977							
1978	YES		5	3	3		
1980	YES		5	5	5		5
1985		YES					
1989	YES						
1990	NO						
1991	NO						

### Disturbance

This pair of birds appear to be habituated to an incredible amount of disturbance including blasting less than 1km from the cliff, heavy equipment and trucks driving underneath the nest at a distance of about 50m and men walking around daily at about 1km from the nest site. Despite this they were not able to tolerate intense activity and the presence of human walking directly under the nest cliff at a distance of about 35m. At first the female did remain on the cliff and watch the activity but soon was forced to leave the area. For three days the birds returned each morning to the site but left when the workmen arrived. When I returned to the site three days later the pair had deserted the site but were observed in the territory briefly on 11 days later.

Result - No nesting attempted.



### 1990 Breeding season

Birds were not observed at or near this site at any time throughout the 1990 breeding season.

#### Disturbance

Although in 1989 this pair of birds appeared to be habituated to an incredible amount of disturbance including blasting less than 1km from the cliff, heavy equipment and trucks driving underneath the nest they were not observed at the site in 1990.

Result - No nesting attempted.

### 1991 Breeding season

No falcons were observed at or near this site at any time throughout the 1991 breeding season. A pair of Great Horned Owls did nest successfully in the old Raven nest on the cliff face.

#### Disturbance

Although in 1989 this pair of birds appeared to be habituated to an incredible amount of disturbance including blasting less than 1km from the cliff, heavy equipment and trucks driving underneath the nest they were not observed at the site in 1990 nor in 1991.

Result - No nesting attempted.

### **Buffalo Jump East Nest Site - Raven site(CWS files), #40(Young et al. 1986)**

#### History

This is one of the original nest sites documented in 1968 and monitored by CWS through the early 1980's. The territory was reported to be occupied in 1986 and again in 1987.

### 1989 Breeding season

The pair were observed in close association at the east end of the Buffalo Jump Cliff on April 2. A third bird which appeared to be a female was also observed near the fence line. The following day two pair were observed, with the fence line the rough demarkation of the territories. On April 6 a single male was present and was observed going into nest

holes with both females. On the 14th the three birds were again present but the male now appeared to be attached to the eastern territory. The female appeared to be incubating by May 10 and is noted to be very shy. The male was trapped and banded May 17th and the four young caught and banded on June 20th.

**BUFFALO JUMP EAST**  
1968 - 1991

YEAR	PAIR	INDIV	EGGS	YOUNG	FLEDGE	BAND AD	BAND YOUNG
1968	YES		5	5			
1969	YES		5	5	5		5
1970	YES		5	4	4		4
1971							
1973							
1974	YES		4				
1975							
1976	YES		5	4	4	mTr,fTr	3
1977	YES						
1978	YES		5	5	5		5
1980		YES					
1985	YES						
1986	YES						
1987	YES						
1989	YES			4	4	mTr,	4
1990	YES			5	5		4
1991	YES				4		4

**Disturbance**

Disturbance to this pair was minimal and other than our visits it is doubtful that these birds had any contact with human. The nearest road is .7km to the southeast and the traffic does not seem to influence the pair at all.

## Results - 4 young fledged

### 1990 Breeding season

The pair were observed at this site on Feb 27 at the east end of the Buffalo Jump Cliff. The male was positively identified as last years male by the colour band combination, the pair was observed copulating on April 17. The female was observed incubating on 24 and at the same time the same male was observed with a second female near the fence line. Male observed bringing food to five young in the nest on May 31. A female was perched near the fence line.

### Disturbance

Disturbance to this pair was minimal and other than our visits it is doubtful that these birds had any contact with human. The nearest road is .7km to the southeast and the traffic does not seem to influence the pair at all.

## Results - 5 young fledged

### 1991 Breeding Season

A lone falcon observed at the site on March 18. On April 9 two females observed at the cliff. One female at the BJE nest site the other near the fence-line. One April 9 a lone male was observed at the cliff moving freely between the two females. The female in the east nest was either laying or incubating. She came from the nest when the male was near then went back into the hole after. This appears to be the same pair as in other years. The male was positively identified with his colour band and number, the female was just very shy as always. They raised and fledged four young. All banded

987-24185 female

987-24186 female

816-34378 male

817-34379 male

## Results 4 young fledged

### Disturbance - Minimal throughout 1991

## Buffalo Jump West Nest Site

### History

This is a new nesting territory and results from the splitting of a long established territory at the Buffalo Jump Cliff. This male appears to be mating with two females.



**BUFFALO JUMP WEST**  
**1968 - 1991**

YEAR	PAIR	INDIV	EGGS	YOUNG	FLEDGE	BAND AD	BAND YOUNG
1989	YES		3				
1990	YES						
1991	YES						

1989 Breeding Season

A female was first observed here on April 1 at the same time as the pair were noted at the east end of the cliff. The situation was very confused as only three birds were observed on most visits. Courtship feeding, nest ledge behaviour and attempted copulation observed by the one male with both females. A second male was observed with this bird on April 3 and again on May 2. The female was flushed from the nest ledge where she was incubating three eggs on May 22. On June 19 no birds were present at the west end of the cliff. The three eggs remained in the nest but were cold and were found to be addled.

**Disturbance**

Disturbance to this pair was minimal and other than our visits it is doubtful that these birds had any contact with humans. The nearest road is .7km to the southeast and the traffic does not seem to influence the pair at all.

Results - infertile eggs resulting in nest failure.

1990 Breeding Season

A second female was first observed here on April 24. At the same time the other female was incubating at the east end of the cliff. The situation appeared to be the same as in 1989 except that we were able to identify the male as the same bird that had mated with the female in Buffalo Jump East. Courtship feeding, nest ledge behaviour and copulation were observed by the same male with both females. The female was flushed from the nest ledge on May 15 where she was apparently incubating. That was the last time she was observed and no eggs were found when the ledge was checked later.

## Disturbance

Disturbance to this pair was minimal and other than our visits it is doubtful that these birds had any contact with humans. The nearest road is .7km to the southeast and the traffic does not seem to influence the pair at all.

Results - (no young produced)

### 1991 Breeding Season

The female was first observed here on April 8. The female at BJE was also present. On April 9 the lone male was observed to copulate with this female and then fly and perch near the Buffalo Jump West nest site. The male as positively identified by colour bands. The female remained sitting on the outcrop near the large hole. On April 23 this female was flushed from the large hole. The male and other female flew off to the east as we approached the cliff. The female from the west flew out with deep slow courtship flying. She went to perch near the west hole and wailed occasionally. She was not seen again and when the nest was climbed there was a deep nest scrape but nothing else. This seems to be pretty much a repeat of the other three years.

Results - (no young produced)

Disturbance -

Minimal throughout the breeding season

## Bitango Eagle Nest Site

### **BITANGO EAGLE NEST EYRIE**

**1990 - 1991**

YEAR	PAIR	INDIV	EGGS	YOUNG	FLEDGE	BAND AD	BAND YOUNG
1990	YES				4		2
1991	NO						

## History

This is a new nesting territory not known to have been occupied prior to the 1990 nesting season. The nest site is an old Golden Eagle nest on the side of a cliff about 1km south of the Bitango Bridge nest site.

### 1990 Breeding Season

Birds were first observed during courtship on April 5. Thought to be an alternate site for Bitango pair and not observed further once the Bitango pair were on eggs. We were next advised of the presence of these birds on June 23 by a trucker who saw them as he hauled fill along the road under the nest. We visited the nest on June 25, the adults were present and the young were already fledged. Two were caught and banded.

Results - (four young fledged)

### 1991 Breeding Season

A single falcon was seen on the stick nest to the west of last years nest site on March 1. On the next visit a Canada Goose was observed sitting on last years nest and no falcons were observed in the area. That was the situation right up to the nest flooding.

Results - No birds observed.

### Disturbance

Minimal disturbance prior to the flooding.

Bitango Bridge Nest Site - #37 (Young et al.,1986)

### BITANGO EYRIE

1985 - 1991

YEAR	PAIR	INDIV	EGGS	YOUNG	FLEDGE	BAND AD	BAND YOUNG
1985	YES						
1989	YES			5	5	fTr	5
1990	YES						
1991	NO						

### History

This is a new nesting territory not occupied in the 1960's. The territory is first described by Young (Young et al.,1986)

### 1989 Breeding Season

The pair were first observed on territory March 8 and were subsequently observed at every visit. Some courtship activity and a food transfer observed on March 23. The female was flushed from the nest on May 1st where she had apparently been incubating. The female was trapped and banded on May 1. Five young were caught and banded on June 18.

#### Disturbance

This pair were subjected to considerable disturbance and habitat alteration. Apparently the timing of the most severe disturbance was such that the birds were able to tolerate it. Tree removal took place prior to the breeding season and the bulk of the heavy equipment and gravel removal well into incubation and the rearing of young. In addition to this there was considerable human activity in the form of picnickers, and fishermen near the bridge and occasionally opposite the nest site itself. In general the pair were shy and nest success can best be attributed to the timing of the various activities.

Results - 5 young fledged

**Bitango Bridge Nest Site - #37 (Young et al., 1986)**

### 1990 Breeding Season

The pair were first observed on territory Feb 27. Courtship and nest ledge behaviour observed on April 3 the female was identified as the same female as 1989 by observing the colour band combination. The female was observed incubating. On May 15, 17, 23 and the male was observed sitting at the east end on one occasion. The birds were gone on May 31. Clearly the nest was deserted, apparently due to the heavy rains of the previous few days. On later inspection, it was believed the nest was exposed and the eggs would have been sitting in water.

#### Disturbance

This pair were subjected to heavy equipment activity for most of the season, however there was no indication that the birds were disturbed. They courted, bred and nested despite the continuing long range disturbance. The pair did not appear to be affected by the activity or by the tremendous dust that was generated well into incubation.

Results - (nest desertion)



### 1991 Nesting Season

In April Great Horned Owls observed nesting in the 1989 nest hole. Two young were taken from this nest due to flooding and transferred to the rehabilitation centre in Coledale on May 9.

#### Disturbance

Minimal prior to flooding

#### Tennessee Coulee Nest Site

### TENNESSEE COULEE EYRIE 1989 - 1991

YEAR	PAIR	INDIV	EGGS	YOUNG	FLEDGE	BAND AD	BAND YOUNG
1989		YES					
1990	YES			4	4	1Tr,	4
1991	YES		5	4	4		4

#### History

This territory was first identified in 1989 when a female was flushed late in the breeding season. The condition of the nest site and the large accumulation of guano indicates that the territory is an old one with many years of occupancy. In 1990 the birds used a different site.

### 1990 Breeding Season

On April 5 a lone bird flew over the coulee at considerable height. I suspect this was the male. He was not aggressive and did not act territorial. When I returned on June 6th a female was heard cackling and was very territorial. This was an odd pair in that the female was very tame and the male exceedingly shy. The nest was not actually located until just prior to banding and was less than 100m from the Red-tail nest. The young could not be seen from below.

#### Disturbance

Disturbance at this site would be minimal.

Results- 4 young fledged, adult female caught and banded.

### 1991 Breeding Season

A lone bird observed flying over the coulee on April 8. Female observed incubating in last years nest hole on April 19 of this year. The Prairie Falcon and Red-tail were observed incubating on several occasions as I visited the coulee to keep track of the water level. On May 20 we collected the eggs. They were pipping when we collected them. We were not able to find a suitable nest to foster the eggs so they had to be placed under a brooding chicken. The eggs were subsequently placed in Castle Dairy and four out of five hatched and were fledged.

#### Disturbance

Minimal prior to flooding. Following flooding a power boat was observed right in the coulee beside the nest. The eggs were collected the same day.

Results - 4 young fledged and banded at Castle Dairy.

### Lang Nest Site

#### History

This a new site first recorded in 1989 it is about 2km east of CWS Cowley site documented in 1968

### 1989 Breeding Season

Three birds were observed at the site on March 31 and again on April 1. Nest ledge displays and courtship flying observed, the third bird just seemed to be staying in the area. Copulation observed on April 7 and the female appeared to be incubating on May 1st. The female was trapped on May 21. The nest was checked again on June 18 and it contained one egg, a broken egg and a two-week old youngster. This bird was later banded on July 1.

#### Disturbance

Disturbance at this site would have been only moderate with a few fishermen about .5km upstream in June and some woodcutting downstream in May.

Results - 1 young fledged

### 1990 Breeding Season

First observed on March 26 with the male bringing food to last year's nest ledge. As in 1989, a second female was also at the site. Three birds were again observed at the site on April 5, after a brief encounter the second female left and one female remained and perched on the ground to the west of last years nest and began wailing. The Male flew by and lit in a small hole under the cliff edge. Nest ledge displays and courtship flying

observed. On April 17 female observed incubating in the new nest hole. Young observed May 30. Five banded on June 21, adult male caught and banded on June 25.

### Disturbance

Disturbance at this site would have been only moderate early in the breeding season. No birds were observed in the area at this time. Once the reclamation was complete we observed no outside disturbance and any disturbance would have been minimal.

Results - 5 young fledged, adult male caught and banded.

### LANG'S EYRIE 1968 - 1991

YEAR	PAIR	INDIV	EGGS	YOUNG	FLEDGE	BAND AD	BAND YOUNG
1968	YES		5	4			
1969	YES		4				
1970	GHO	YES					
1971	GHO						
1972	GHO						
1973	GHO						
1974	GHO						
1975	GHO						
1976	GHO						
1977	GHO						
1978	GHO						
1980	GHO						
1989	YES		3	1	1	fTr,	1
1990	YES			5	5	mTr	5
1991	YES						

### 1991 Breeding Season

A single prairie observed over the cliff on March 18. No birds were observed at the site again until April 19. Two birds observed on the cliff The female wailing and the pair going from ledge to ledge. On the 22nd when we arrived the prairies were absent but returned shortly. The female went to last years nest ledge. She appears to be heavy with eggs. No birds at the site on the 25 when we arrived. Heard wailing and a single bird flew by and perched at the east end of the cliff area. Raven on the nest. 09:23 the male was observed chasing a Raven then flew to perch in a sheltered area near last years nest hole.

Female observed on a perch near the fence line. the male may have a red band on right leg (???). The male remained perched out of the wind preening. 09:30 the female flew to the nest hole 09:33 the female flew above the cliff and lit on the grass, she was followed by the male and they copulated. 09:37 male flew above the cliff and the female remained perched. Two prairies came in very high from the west. A male and a female. The male made a couple of passes at the female. Both came down in front of the cliff. The original female flew into the nest hole and perched at the mouth and eechipped as the others flew by. The male attacked the other female and then both went off to the east at great height, The female headed north after a couple of attacks by the male at one point they actually grappled. The original female flew out of the nest and perched above the cliff 09:57 female moved off to the left right out of the area.

No falcons were seen at the site again until May 23 when a lone male was on the cliff. A lone bird was observed again on June 1.

Results - nesting failed.

**Welsch Nest Site - #22 (Young et al. 1986)**

### History

This appears to have been CWS Rapid Bend site, however, severe slumping along the cliff face have drastically changed the cliff. In its present condition it was first described by Young as #22 in his report (Young et al. 1986) in 1985.

### 1989 Breeding Season

The pair were first observed at the site March 9 and both birds were observed on most visits to the site. Other than a hint of courtship flying no other courtship activity was observed. The female was observed at the entrance of the nest hole on several occasions and appeared to be incubating on April 15. The pair were trapped and banded on May 21 and 4 young were caught and banded June 18. The young fledged successfully.



## Disturbance

At the beginning of the breeding season disturbance was minimal. Although the main road was approximately 150m from the nest site the nest was on a cliff facing away from the road and the birds were largely unaffected by traffic. On April 5 heavy earthmoving equipment was observed working about 2km. to the north and there was some evidence of activity on the hill above and behind the nest site. By April 7th the activity had accelerated and the earthmoving equipment was now dumping material above and behind the site. The

**WELSCH EYRIE**  
**1972 - 1991**

YEAR	PAIR	INDIV	EGGS	YOUNG	FLEDGE	BAND AD	BAND YOUNG
1972	YES						
1973	YES		5	4	4		4
1974	GHO	YES					
1975	YES		5	4	4	fTr	4
1976	GHO						
1977	YES		5			fTr	
1978	YES		4				
1980	YES		4	2			
1985	YES						
1989	YES			4	4	mTr, fTr	4
1990	YES			4	4		4
1991	YES						

activity was continuous, with the noisy earth moving equipment visible to the birds the majority of the time. When revisited on April 13 the activity was unabated and by the presence of the lights apparently was ongoing round the clock. The pair are still present and apparently incubating. The male was observed to fly in literally through the dust and land at the south end of the cliff. Some of the material that has been moved has actually been dumped so that it has come down the side of the cliff less than 50m to the north of the nest. The activity is very, very noisy and virtually continuous however, there are seldom people walking around and the birds do not seem to be overly concerned by the activity and noise. By May 1st construction work appeared to be completed. No additional activity was

observed in direct association with the nest until July 7 when the earth moving equipment began to level an area directly opposite the nest site. The young fledged and moved off to the north.

Results - 4 young fledged

### 1990 Breeding Season

The pair were first observed at the site March 6 and as in 1989 both birds were observed on most visits to the site. Nest ledge displays were observed in late March and early April. During the few days when the caterpillar was doing land reclamation opposite the site, at each visit the female was observed sitting at the extreme north end of the cliffs. The female apparently was incubating by April 16 so that the disturbance in no way affected normal courtship and nesting. April 15. Although we were not able to catch the pair in 1990 the female was identified as last years female by her colour band combination. Four young were banded on June 19.

Disturbance

At the beginning of the breeding season, disturbance was minimal prior to the reclamation of the gravel area in front of the nest cliff. This was carried out during the first week of April and the birds simply perched at the north end of the cliffs. As soon as the reclamation was complete, the birds moved back to the nest area and normal nesting continued. Disturbance following the reclamation would have been minimal.

Results - 4 young fledged

### 1991 Breeding Season

The pair were observed on the cliff on March 18. On subsequent visits only a single bird was seen. On April 20 both birds were present and both were identified by their bands. On May 5 the female was observed incubating in a small hole about 15' to the left of the old nest site. Female incubating on subsequent visits, 5 eggs in the nest on May 20. June 9 small downy young in the nest. Large young in the nest on June 20. When visited by John Campbell a few days later the nest was empty. Predated??.

Disturbance

Minimal in 1991

Results - Nest failure

## Day Nest Site

### History

This is a new territory apparently occupied for the first time in 1989. A single bird was observed in this territory in 1988 and the pair were first observed in 1989 investigating a new artificial nest site. They chose a ledge about 50m to the north of the artificial nest hole.

### 1989 Breeding Season

On March 31st three birds were observed flying over the cliffs, one bird believed to be the female was observed at several ledges and the artificial nest hole. Courtship flying and copulation was then observed on April 7th. However, following this no birds were in evidence for several days and it appeared that the birds had left the cliff. Finally the head of the incubating female was observed on a very small ledge about 50m to the north of the hole. Male trapped and banded on May 22. They were incubating five eggs. Three young were hatched, one disappeared and the remaining two were caught, banded and fledged.

### Disturbance

Disturbance at this site was minimal throughout the nesting season.

Results - 2 young fledged

#### Day's Eyrie 1989 - 1991

YEAR	PAIR	INDIV	EGGS	YOUNG	FLEDGE	BAND AD	BAND YOUNG
1989	YES		5	3	2	mTr	2
1990	NO						
1991	NO						

### 1990 Breeding Season

Courtship flying observed on March 6 and one bird seen at the modified artificial nest site. Again on March 26 a female was observed at the nest site and was observed flying out into the valley and returning to it frequently. On April 3 a lone Prairie was observed hunting in the area then flying directly up to cliffs on 1st Porcupine. On checking, no falcons

were observed at 1st Porcupine. Other than incidental sightings there was no further indication of Prairie Falcon interest in the ledges at Day's in the 1990 breeding season.

#### Disturbance

Disturbance at this site was minimal throughout the nesting season.

Results - See 1st Porcupine.

#### 1991 Breeding Season

No prairies observed on any visit in 1991. Pair at 1st Porcupine.

#### Disturbance

Disturbance minimal throughout the breeding season.

#### 1st Porcupine History

This site was first documented in 1990. Two artificial nest sites were created on the cliff and a third very accessible natural site was present.

#### 1st Porcupine Eyrie 1990 - 1991

YEAR	PAIR	INDIV	EGGS	YOUNG	FLEDGE	BAND AD	BAND YOUNG
1990	YES			5	5		5
1991	YES			6	6		6

#### 1990 Breeding Season

No Prairies were observed on these cliffs at our first visits in March and early April. Then following the observation of the male flying toward the cliff on April 3 and the desertion of the Day site a Prairie Falcon was observed patrolling the cliff. This bird was observed investigating one of the artificial sites and appeared to have chosen it as a site. On April 17th territorial behaviour was noted as a bird flew out from the natural nest site. At one point three prairies were in the air or investigating ledges on the cliff. Considerable aggression and the third bird was chased from the area. For the remainder of the breeding season there was considerable interaction with other species on the hill. Young were first observed on June 2nd and appeared to be at least 3 weeks of age. Five young were banded



on June 18 and both adults were trapped. The male was last years male from Days and the female had been previously banded and may have been the female from Days as she was not caught in 1989.

## Disturbance

Human related disturbance at this site would be minimal.

## Results - 5 young fledged

### 1991 Breeding Season

A female prairie observed on the dead tree in front of the cliff on March 18. On April 5 between four and five prairies working the cliff face. Some courtship flying and one of the females examining nest ledges and eechipping. On the 6th a pair present the male observed attacking a bald eagle that flew near the cliff. The female sat on the cliff and remained perched. By the 8th of April the female appears to have decided on the P.C. hole. The female observed wailing at the male and he ignored her. A pair of prairies observed at the cliff then the male came in and there was a changeover. The female went out to perch on the dead tree. Birds observed fairly regularly at the site through May 20 when we climbed the nest to check the age of the young. On the 21st we gave then 2 young from Fairbrother's. On the 23 a second female was observed on the cliff at last years nest site. She then flew out in a beautiful series of slow courtship undulations and flying. Birds at the cliff on every visit until we went in to band the young on June 18.

Young banded as follows:

987-24196 female  
987-24197 female  
987-24198 female  
987-24200 female  
816-34387 male  
816-34388 male

## Disturbance

Human disturbance would be minimal all season

## Results -6 Young fledged.

### **Double Ox-Bow Nest Site - # 18 (Young et al., 1986)**

#### History

This territory was first described by Young (Young et al., 1986) and apparently was first located in 1985.

### 1989 Breeding Season

The pair was first observed on April 15th. They were very placid and I could not decide if there was any nesting activity. This behaviour was also observed on my next visit several weeks later. On May 22 the female was flushed from the nest where it appeared she

### **DOUBLE OX-BOW EYRIE**

**1985 - 1991**

YEAR	PAIR	INDIV	EGGS	YOUNG	FLEDGE	BAND AD	BAND YOUNG
1985	YES						
1989	YES					fTr,	
1990	NO						
1991	YES						

had been incubating. The female was very aggressive and was trapped and banded. The male could not be caught. When we returned to band young the nest was empty and both adults flew off silently suggesting a nest failure.

#### **Disturbance**

Disturbance at this site would be minimal as it is very difficult to visit.

Results - nest failure.

### 1990 Breeding Season

The site was unoccupied. Despite frequent visits the only observation was of a single bird flying in front of the cliff and out of the valley on June 5.

#### **Disturbance**

Disturbance at this site would be minimal as it is very difficult to visit.

Results - not occupied

### 1991 Breeding Season

On May 7 a female was observed in the nest ledge. She appeared to be incubating and remained on the nest for the half hour+ that we remained there. On our return visit in June to band the young the nest was deserted and there was no sign of eggs or young in the nest ledge.

Results - nesting unsuccessful

Horseshoe Canyon Nest Site - #15 (Young et al.,1989)

### HORSESHOE CANYON 1974 - 1991

YEAR	PAIR	INDIV	EGGS	YOUNG	FLEDGE	BAND AD	BAND YOUNG
1974	YES		4	4	4		4
1975	YES		5	4	4		4
1976	YES		5			fTr,	
1977	YES		5	4	4		4
1978		YES					
1979	YES						
1985	YES						
1989	YES			4	4		4
1990	YES			4	4	fTr,	4
1991	YES						

### History

Either this territory or Maloff's was reported to have been a historical Peregrine Falcon nesting territory, however neither were occupied when checked in the 1960's and 1970's. It was first recorded by Young (Young et al.,1986) and apparently was occupied by Prairie Falcons in 1985.

### 1989 Breeding Season

A single bird was observed entering the Canyon on March 9 and a pair were observed on territory the following day. I was unable to visit the site until mid April

however, no birds were observed from the opposite side of the river. On April 14 the female was flushed from the nest and was joined by the male. The pair remained nearby, they were relatively shy and silent. When we tried to trap the adults they ignored the owl and remained shy and relatively quiet. Four young were banded on June 18 and fledged young were observed in the area early in July.

#### Disturbance

Disturbance at this site would have been minimal.

Results - 4 young fledged

#### 1990 Breeding Season

A single bird was observed flying out of the canyon and perching on the hill behind last years eyrie. This year the birds selected the old original site recorded by CWS in 1974. The nest clearly has been improved apparently by the CWS crews. Female caught. A second female was flushed from a ledge about 100m to the south and was later found to be a second nesting female. The male was observed to be interacting with both females on two occasions and only one male was ever seen in the territory. On one visit, the female from the second nest was absent suggesting that she was perhaps out hunting.

#### Disturbance

Disturbance at this site would have been minimal.

Results - 4 young fledged from the north site. and 2 from the second site.

#### 1991 Breeding Season

A single bird was observed on March 18. The pair was first observed on April 5th and again later in the month. On both occasions they were near the original nest site. The female flushed from the nest and then returned with us very near. She stood briefly and then walked in to incubate. Same procedure the next time we visited the female was very tame and flushed when we were right beneath the eyrie only to return shortly and walked straight in to incubate. On May 15 the male flushed when we entered the coulee. Both birds were present and the female flew back to the nest after flying around once or twice. Went to the nest on May 20 and pulled the three 4-5 day old young placed them first in Fairbrother's then 1st Porcupine.



Disturbance - minimal prior to the flooding. The flooding resulted in the loss of the nest site.

Results - three young fledged at 1st Porcupine.

#### Horseshoe Canyon B Nest Site

#### HORSESHOE CANYON B 1990 - 1991

YEAR	PAIR	INDIV	EGGS	YOUNG	FLEDGE	BAND AD	BAND YOUNG
1990	YES			3	3		3
1991	YES						

#### History

This nest site was first located this year within 100m of the existing nest site.

#### 1990 Breeding Season

A single bird was observed flying out of the canyon and perching on the hill behind last years eyrie. This year the birds selected the old original site recorded by CWS in 1974. The nest clearly has been improved apparently by the CWS crews. A second female was flushed from a ledge about 100m to the south and was later found to be a second nesting female. The male was observed to be interacting with both females on two occasions and only one male was ever seen in the territory. On one visit, the female from the second nest was absent suggesting that she was perhaps out hunting.

#### Disturbance

Disturbance at this site would have been minimal.

Results - 2 from the second site

#### 1991 Breeding Season

No birds were seen at this nest site nor apparently looking at the site.

#### Results

No occupancy.

**Maloff Nest Site # 12 (Young et al.,1986)****History**

This territory was reported to have been an historical Peregrine Falcon nesting territory, however, it was not occupied when checked in the 1960's and 1970's. This site was first recorded in 1974 by CWS and was monitored by them until the early 1980's. It was next described by Young (Young et.al.,1986) and apparently was occupied by Prairie Falcons in 1985.

**1989 Breeding Season**

The pair were first observed on territory on March 9 and one or both were present on every subsequent visit to the site. The birds appeared to ignore the heavy equipment and men working about .5km to the west near the end of March. The female appeared to be incubating early in May. The male was trapped and banded on May 21st and an unsuccessful attempt was made to catch the female on the 24th. At the time there was one newly hatched chick and three unhatched eggs in the nest. It was a bitterly cold day and we gave up on our trapping attempt because we were concerned for the chick. Unfortunately the nestling subsequently died and the other eggs which failed to hatch appeared to be addled.

**MALOFF EYRIE**  
**1974-1991**

YEAR	PAIR	INDIV	EGGS	YOUNG	FLEDGE	BAND AD	BAND YOUNG
1974	YES		3				
1975	YES						
1976	YES		4	3	3		3
1977	YES		5	4	4	fTr	4
1978	NO						
1980	NO						
1985	YES						
1989	YES		4			mTr	
1990	YES			3	3	mTr,fTr	3
1991	YES						

## Disturbance

This pair of birds were habituated to a moderate amount of disturbance each breeding season just with the normal activity at the farm opposite the nest cliff. However, when this disturbance pattern accelerated with the earth moving equipment they were apparently unconcerned and no unusual behaviour was observed.

Result - nest failure.

## 1990 Breeding Season

A falcon was observed defending the territory against a Golden Eagle on Feb 27. Then a single bird was observed at the nest ledge on March 6. The pair were first observed on territory on March 26. One or both were present on every subsequent visit to the site. The female appeared to be incubating on May 21. Three young were produced and were banded on June 21. The two adults were trapped on June 27. The female for the first time, the male was the same bird banded at the site in 1989.

## Disturbance

In 1990 the disturbance throughout the nesting season would have been minimal.

Result - 3 young fledged

## 1991 Breeding Season

A pair of falcons over the cliff on March 18 observed attacking a golden eagle. Female observed going in to settle on the eggs on April 14. On April 23 two men were hunting "gophers" with rifles and a shotgun opposite the nest site. The female left the area when the shooting was going on and returned when they left. Female observed perched at the mouth of the nest occasionally going back inside. Suggests there are young in the nest. On June 4 three young were observed. Later 4 large young observed. They were banded on June 18 as follows:

987-24188 female

987-24189 female

816-34385 female

816-34386 female

Disturbance - The female was frightened from the nest on April 23 by the two men hunting opposite the nest site. She did return after they left the area and fledged four young successfully.

Results - 4 young fledged.

## Castle Dairy Nest Site

### Castle Dairy 1989 - 1991

YEAR	PAIR	INDIV	EGGS	YOUNG	FLEDGE	BAND AD	BAND YOUNG
1989	YES		5	4	4	mTr	4
1990	YES			4	4		4
1991	YES			5	6 foster		6

### History

This is a new site in an artificial nest hole which had been constructed earlier in the year.

### 1989 Breeding Season

A female prairie that appeared to be in first year plumage was first observed on the cliff on May 1st. The bird acted territorial and was observed to perch near a hole just to the east of the raven nest. By May 10th the female appeared to be incubating and sat very close when I drove up to a point directly opposite the nest. We tried unsuccessfully to trap the female on May 21st however we were able to trap and band the male on the 24th and found the nest to contain 5 unhatched eggs. Four young were caught and banded on July 1st. They were observed again on July 7 and appeared ready to leave the nest.

### Disturbance

This pair experienced minimal to moderate disturbance primarily from the activity of people on the opposite side of the river. There was some evidence of picnicking and fishermen were on the river for much of the month of June.

Results - 4 young fledged.

### 1990 Breeding Season

The pair were observed at the east end of the cliffs on March 6 and one or both birds was present on each subsequent visit to the area. By March 26 it was clear that they had selected a new nest hole at the east end. On April 16 the female appeared to be either laying or incubating. On May 30th the male was observed to bring food to the cliff, pluck



it and then go to the nest hole and begin to feed small young. Four young were banded on June 20 and although we were not able to catch the adults we did get an opportunity to identify the male as the same bird as that banded in 1989.

#### Disturbance

This pair experienced minimal disturbance. There was much less activity than in 1989.

Results - 4 young fledged.

#### 1991 Breeding Season

A male bird was observed examining nest holes on March 18. On April 6th a female was observed sitting in the central nest hole. Later a Canada Goose was observed examining the old raven nest and Horned Owls were found to be nesting in last years prairie nest hole. On April 9 the female was observed incubating in the central nest hole. The female was observed incubating several on days. The male was seldom observed. Yet on April 17 the male was observed flying along the cliff face with food. Following the food transfer he was then observed flying to the nest wailing as he flew. The female was sitting on the fence-line feeding. Female observed incubating on every visit. On May 21 nest climbed , 5 eggs two just hatching. The two young taken to Fairbrother's and the eggs from Tennessee placed with this hen. On May 22nd county workmen were working at the gravel pile on the opposite side of the river(300m +). The female seemed to ignore this and no harm was done. 6 young banded as follows:

987-24187 female  
816-34380 male  
816-34381 male  
816-34382 male  
816-34383 male  
816-34384 male

Results - 6 young fledged

#### **Fairbrother Nest Site**

#### History

This is one of the original nest sites documented in the late 1960's and monitored by CWS through the early 1980's. This site was not included by Young (Young et al.,1986) presumably because it is approximately 3km from the construction area and will not be affected by either the construction or flooding. I have included it because of its relative proximity and the fact that there is considerable interaction between these birds and those that will be affected by the dam.

**FAIRBROTHER'S EYRIE**  
1968-1991

YEAR	PAIR	INDIV	EGG S	YO UN G	FLEDG E	AD BAND	YOUN G BAND
1968	YES		4	1			
1969	YES		4	4	4	mTr,fTr	
1970	YES		6	4	4		4
1971	YES		5				
1972	YES		5		1		
1973	YES			5	5	mTr,fTr	5
1974	YES		5	3	3		3
1975	YES		5,4	2	2	fTr	2
1976	YES		5,4	4	4	mTr,fTr	4
1977	YES		3,4	4	4	mTr,fTr	4
1978	YES		5	1	1		
1980	YES			5			
1989	YES			3	3	mTr,fTr,	3
1990	YES			3	3		3
1991	YES			3	6 foster		6

1989 Breeding Season

A single bird was observed at the site on March 8th and 9th. The first observation of a second bird was made on the 23rd and then again on the 24th. Courtship activity was observed. The male was observed defending the territory against a Golden Eagle on April 6th. A single egg was found in the nest on April 15th. Five eggs were in the nest at the next visit when we trapped and banded the adult birds. Three young were caught and banded on June 19th and were later observed fully fledged flying along the cliff face.

## Disturbance

This pair would have be subjected to a minimal amount of disturbance by virtue of the sites relative inaccessibility.

Results - 3 young fledged.

### 1990 Breeding Season

The pair were observed at the site on Feb 27 and birds were only seen infrequently prior to our visit in June. We were unsuccessful in trapping the adults on June 6 but were able to band the three young later in the month.

## Disturbance

This pair would have be subjected to a minimal amount of disturbance by virtue of the sites relative inaccessibility.

Results - 3 young fledged.

### 1991 Breeding Season

Pair first observed at the site on April 12. Female observed incubating on May 6. This pair are seldom seen from the road as we checked virtually every time we drove by and only rarely saw the female at the ledge. On May 20 we visited the nest and climbed it. Three newly hatched young and we added the three young from Horseshoe. On May 21 we returned, both adults present. All six young alive and healthy. Placed the two small young from Castle Dairy in with the others and took the two largest young out to place in 1st Porcupine. Several checks were made, both adults present and young fine. We then returned on June 18 and banded the six young as follows:

987-24190 female

987-24191 female

987-24192 female

987-24193 female

987-24194 female

987-24194 female

Table 6.

## Oldman River Prairie Falcon Territory Occupancy 1968-1991

	68	69	70	71	72	73	74	75	76	77	78	80	85	86	87	89	90	91
OB	F	F	O	F	F	F							F	F	F	S	F	F
ME	F	F	F	S		F		F	F	F	F	F	F	F	F	F	F	F
DAM			F	F			F				F	F	S	S		F		O
BJE	F	F					F		F	F	F	S	F	F	F	F	F	F
BJW														U	U	F	F	F
BBR													F	F	F	F	F	O
BEA														U	U		F	
TEN														U	U	S	F	F
LAN	F	F	O	O	O	O	O	O	O	O	O			U	U	F	F	F
WEL					F	F	O	F	O	F	F		F	U	U	F	F	F
HO1							F	F	F	F	S		F	U	U	F	F	F
HO2																	F	
MAL							F	F	F	F			F	U	U	F	F	F
CD																F	F	F
DAY																F		
1P																	F	F
DOX													F			F		F
FA		F	F	F	F	F	F	F	F	F	F	F	U			F	F	F

# F	4	5	3	4	2	4	5	5	5	6	6	4	8	5?	4?	15	15	13
# O			2	1	1	1	2	1	2	1	1							2

F - Pair of Prairie Falcons on territory

S - A single Prairie Falcon on territory

O - Pair of Great Horned Owls nesting in the territory



## APPENDIX 2. Dates of first sighting of Migrants in 1990

Horned Lark <u>Eremophila alpestris</u>	- March 18
Prairie Falcon <u>Falco mexicanus</u>	18*
Golden Eagle <u>Aquila chrysaetos</u>	18*
Killdeer <u>Charadrius vociferus</u>	18
Richardson Merlin <u>Falco columbarius richardsoni</u>	18*
Canada Goose <u>Branta canadensis</u>	18
Northern Harrier <u>Circus cyaneus</u>	- April 5
Mountain Bluebird <u>Sialia currucoides</u>	5
Red-tailed Hawk <u>Buteo jamaicensis</u>	6
American Widgeon <u>Mareca americana</u>	6
Mallard Duck <u>Anas platyrhynchos</u>	6
Pintail Duck <u>Anas acuta</u>	6
American Crow <u>Corvus brachyrhynchos</u>	7
American Kestrel <u>Falco spawerius</u>	7
Great Blue Heron <u>Ardea herodias</u>	7
Bald Eagle <u>Haliaeetus leucocephalus</u>	7
Goshawk <u>Accipiter gentilis</u>	8
Clarke Nutcracker <u>Nucifraga columbiana</u>	13
Green-winged Teal <u>Anas crecca</u>	13
Bufflehead <u>Bucephala albeola</u>	13
American coot <u>Fulica americana</u>	13
Common Goldeneye <u>Bucephala clangula</u>	13
Ferruginous Hawk <u>Buteo regalis</u>	13
Rough-legged Hawk <u>Buteo lagopus</u>	13
Golden-crowned Kinglet <u>Regulus satrapa</u>	13
Cinnamon Teal <u>Anas cyanoptera</u>	19
Long-billed Curlew <u>Numenius americanus</u>	20
Common Flicker <u>Colaptes cafer</u>	20
Red-breasted Nuthatch <u>Sitta canadensis</u>	20
Short-eared Owl <u>Asio flammeus</u>	20
Swainson Hawk <u>Buteo swainsoni</u>	22
Sharp-shinned Hawk <u>Accipiter striatus</u>	23
Say's Phoebe <u>Sayornis saya</u>	23
Dark-eyed junco <u>Junco hyemalis</u>	25
Yellow-headed Blackbird <u>Xanthocephalus xanthocephalus</u>	25
Red-winged blackbird <u>Agelaius phoeniceus</u>	25
Blue winged Teal <u>Anas discors</u>	25
Osprey <u>Pandion haliaetus</u>	26
Eared Grebe <u>Podiceps caspicus</u>	27
Western Grebe <u>Aechmophorus occidentalis</u>	May 4
Snow Goose <u>Chen caerulescens</u>	4
Ring-neck Duck <u>Aythya collaris</u>	5

Brewers Blackbird <u><i>Euphagus cyanocephalus</i></u>	6
Marbled Godwit <u><i>Limosa fedoa</i></u>	9
Hooded Merganser <u><i>Lophodytes cucullatus</i></u>	13
Cooper Hawk <u><i>Accipiter cooperii</i></u>	14
Tree Swallow <u><i>Tachycineta bicolor</i></u>	14
Cliff Swallow <u><i>Hirundo pyrrhonota</i></u>	14
Wood Duck <u><i>Aix sponsa</i></u>	14
Townsend's solitary <u><i>Myadestes townsendi</i></u>	15
Chipping Sparrow <u><i>Spizella passerina</i></u>	15
Yellow-rumped Warbler <u><i>Debdroica coronata</i></u>	15
Black Tern <u><i>Chlidonias niger</i></u>	16
Canvasback Duck <u><i>Aythya valisineria</i></u>	16
Gadwall <u><i>Anas strepera</i></u>	16

### APPENDIX 3. Birds identified in the study area 1989-91

Western Grebe *Aechmophorus occidentalis*  
 Eared Grebe *Podiceps caspicus*  
 Double-crested Cormorant *Phalacrocorax auritus*  
 Great Blue Heron *Ardea herodias*  
 Whistling Swan *Cygne siffleur*  
 Canada Goose *Branta canadensis*  
 Snow Goose *Chen hyperborea*  
 Mallard *Anas platyrhynchos*  
 Gadwal *Anas strepera*  
 Northern Pintail *Anus acuta*  
 Green-winged Teal *Anas carolinensis*  
 Blue-winged Teal *Anas discors*  
 Cinnamon Teal *Anas cyanoptera*  
 American Widgeon *Mareca americana*  
 Shoveler *Spatula clypeata*  
 Ruddy Duck *Oxyura jamaicensis*  
 Wood Duck *Aix sponsa*  
 Canvasback *Aythya valisineria*  
 Ring-neck Duck *Aythya collaris*  
 Lesser Scaup *Aythya affinis*  
 White-winged Scoter *Melanitta deglandi*  
 Barrow's Goldeneye *Bucephala islandica*  
 Common Goldeneye *Bucephala clangula*  
 Bufflehead *Bucephala albeola*  
 Common Merganser *Mergus merganser*  
 Red-breasted Merganser *Mergus serrator*  
 Hooded Merganser *Lophodytes cucullatus*  
 American Coot *Fulica americana*  
 Sharp-shinned Hawk *Accipiter striatus*  
 Cooper Hawk *Accipiter cooperii*  
 Goshawk *Accipiter gentilis*  
 Red-tailed Hawk *Buteo jamaicensis*  
 Swainson Hawk *Buteo swainsoni*  
 Rough-legged Hawk *Buteo lagopus*  
 Ferruginous Hawk *Buteo regalis*  
 Golden Eagle *Aquila chrysaetos*  
 Bald Eagle *Haliaeetus leucocephalus*  
 Northern Harrier *Circus cyaneus*  
 Osprey *Pandion haliaetus*  
 Prairie Falcon *Falco mexicanus*  
 Peregrine Falcon *Falco peregrinus*  
 Richardson's Merlin *Falco columbarius richardsoni*

American Kestrel *Falco spawerius*  
 Wilson Phalarope *Steganopus tricolor*  
 Killdeer *Charadrius vociferus*  
 Spotted Sandpiper *Actitis macularia*  
 Marbled Godwit *Limosa fedoa*  
 Willet *Catoptrophorus semipalmatus*  
 Long-billed Curlew *Numenius americanus*  
 California Gull *Larus californicus*  
 Ring-billed Gull *Larus delawarensis*  
 Mourning Dove *Zenaida macroura*  
 Rock Dove *Columa livia*  
 Short-eared Owl *Asio flammeus*  
 Long-eared Owl *Asio otis*  
 Great Horned Owl *Bubo virginianus*  
 Common Nighthawk *Chordeiles minor*  
 Ruby-throated Hummingbird *Archilochus colubris*  
 Belted Kingfisher *Ceryle alcyon*  
 Common Flicker *Colaptes cafer*  
 Hairy Woodpecker *Dendrocopos villosus*  
 Yellow-bellied Sapsucker *Sphyrapicus varius*  
 Eastern Kingbird *Tyrannus tyrannus*  
 Western Kingbird *Tyrannus verticalis*  
 Say's Phoebe *Sayornis saya*  
 Western Wood Pewee *Contopus sordidulus*  
 Horned Lark *Eremophila alpestris*  
 Northern Rough-winged Swallow *Stelgidopteryx serripenn*  
 Bank Swallow *Riparia riparia*  
 Barn Swallow *Hirundo rustica*  
 Cliff Swallow *Petrochelidon pyrrhonota*  
 Common Raven *Corvus corax*  
 Common Crow *Corvus brachyrhynchos*  
 Black-billed Magpie *Pica pica*  
 Gray Jay *Perisoreus canadensis*  
 Clarkes Nutcracker *Nucifraga columbiana*  
 Black-capped Chickadee *Parus atricapillus*  
 Red-breasted Nuthatch *Sitta canadensis*  
 Rock Wren *Salpinctes obsoletus*  
 House Wren *Troglodytes aedon*  
 Ruby-crowned Kinglet *Regulus calendula*  
 Golden-crowned Kinglet *Reulus satrapa*  
 Catbird *Dumetella carolinensis*  
 American Robin *Turdus migratorius*  
 Veery *Hylocichla fuscescens*  
 Mountain Bluebird *Sialia currucoides*



Townsend's Solitaire *Myadestes townsendi*  
Sprague's Pipit *Anthus spragueii*  
Bohemian Waxwing *Bombycilla garrulus*  
Cedar Waxwing *Bombycilla cedrorum*  
Northern Shrike *Lanius excubitor*  
Starling *Sturnus vulgaris*  
Yellow Warbler *Dendroica petechia*  
Yellow-rumped Warbler *Dendroica coronata*  
Yellow-headed Blackbird *Xanthocephalus xanthocephalus*  
Red-winged Blackbird *Agelaius phoeniceus*  
Brewer's Blackbird *Euphagus cyanocephalus*  
Western Meadowlark *Sturnella neglecta*  
Common Grackle *Quiscalus quiscula*  
Brown-headed Cowbird *Molothrus ater*  
Pine Siskin *Spinus pinus*  
Dark-eyed Junco *Junco hyemalis*  
Chipping Sparrow *Spizella passerina*  
American Goldfinch *Spinus tristis*  
Vesper Sparrow *Pooecetes gramineus*  
Savannah Sparrow *Passerculus sandwichensis*

#### **APPENDIX 4.** Locations of platforms and nest poles

##### **Watson Coulee**

A pole is located to the south of the dam.

##### **Tennessee Coulee -**

2nd Dam to North - one pole is located to north.

##### **Group Home -**

One pole is located in the ditch at the bend of the road.

##### **Delents**

One pole is located just below the upper dam on a small flat in a bend and the second pole and one pole on the side of the second dam.

##### **Welsch**

Three poles are located on the island.

##### **West of J Crossing Construction Bridge**

Two poles on the island.

##### **Stevick**

Three poles islands.

Total Poles installed = nineteen

Additional nest poles and nest boxes put up for kestrels

## APPENDIX 5. Definitions of terms used in report.

Nesting Territory - The area around a nest site that is normally defended by the pair of birds in residence

Courtship Behaviour - Activities associated with pair formation including the following:

Courtship flying (flight displays)

Nest displays (individual and as pairs)

Nest selection (one of both birds of a pair)

Nest construction (in falcons the scraping a nest hollow)

Food exchanges (where the male brings food to the female)

Copulation or mating attempt

Alternate Nest - A suitable alternate nest site in or adjacent to a nesting territory that is available in the event of failure or loss of a nest site.

Artificial Nest - A man-made nest structure or nest hole that has been constructed specifically to provide suitable nest sites for resident breeding birds. In the context of this project artificial nest structures are being constructed for Prairie Falcons and Ferruginous Hawks and may be utilized by other raptors, geese or ravens.

Foraging Habitat - Habitat associated with a breeding territory that maintains an adequate abundance of accessible prey species.

Young Fledged - the young known to have successfully flown from a nest site.

Disturbance - disturbance is defined as something which disrupts or destroys the peace. In reference to breeding birds disturbance would be any activity which disrupts the breeding cycle. For the sake of discussion and comparison I have referred to disturbance as minimal, moderate, high and severe.

Minimal disturbance would include the incidental transgression of any predator, human, or vehicle into the territory of a breeding pair which may or may not elicit a territorial response. In such an instance, a pair would return to normal behaviour as soon as the transgression ceased.

Moderate disturbance would include frequent transgression of a predator, vehicle, activity or humans in the territory of a breeding pair but at a sufficient distance from the nest site would not constitute a threat.

High disturbance is excessive disturbance which in my opinion would normally result in the desertion of a nest site for a given breeding season but which are tolerated either as a result of habituation or because the activity occurred relatively late in the breeding cycle.

Severe disturbance includes any activity which is threatening early in the breeding cycle, in particular during courtship and nest site selection. Such disturbance is very likely to result in desertion of a nest site or even a nesting territory for that breeding season.

Habituation - "the waning of a response to a repeated activity" (Marler and Hamilton, 1966) or in this application, the ability of individuals or pairs of birds to accept disturbance as a result of increased exposure to an activity which does not harm or threaten the individual or pair.



## APPENDIX 6. SUMMARY TABLES FOR ENVIRONMENTAL HEARING

Summary Table 1.

**Prairie Falcon and Ferruginous Hawk Nesting Summary**

	Prairie Falcon Nest Success			Ferruginous Hawk Nest Success		
	1989	1990	1991	1989	1990	1991
Occupied Territories	15	15	13	3	3	3
Nest Attempts	12	15	12	1	3	2
Failures	3 <sup>a</sup>	2	4 <sup>b</sup>	1	1	
Successful nests	9	13	8	1	2	2
Young Fledged	31	47	31	3	5	6
Production per nest attempts	2.58	3.33	2.58	1.5	1.66	3
Production per successful pair <sup>c</sup>	3.44	3.85	3.87	3	2.5	3

<sup>a</sup> Two of these failures were attributed to human disturbance.

<sup>b</sup> One of these failures was attributed directly to human disturbance.

<sup>c</sup> Good Prairie Falcon nesting success as per studies in Idaho and Colorado = 3.1 to 3.2 per successful pair.

Summary Table 2.

**Banding Summary**

	Adults		Immatures		Total	Field Identified
	Color and USF&W	USF&W	Color and USF&W	USF&W		
1989	13		31		44	
1990	6		47		53	5
1991				31	31	8
Total	19		78	31	128	13

Summary Table 3.

**Artificial and Improved Nest Sites**

	Artificial holes	Utilized by Prairie Falcons	Utilized by other species	Total Occupied
Prior to 1989	15	1	1 Raven 1 Canada Goose	3
Prior to 1990	+32 = 47	3	1 Canada Goose 1 G.H.Owl	5
Prior to 1991	+3 = 50	4	2 Canada Geese 1 G.H. Owl	7
Total	50	8	7	15

19 Nesting Platforms were erected in the fall of 1990

2 of these were occupied by Red-tailed Hawks  
with no attempted nesting.

Several Nest Boxes were set out in the fall of 1990

5 of these were occupied and used as nest sites by Kestrels in 1991

Summary Table 4.

## Oldman River Nest Occupancy

	68	69	70	71	72	73	74	75	76	77	78	80	85	86	87	89	90	91
OB	F	F	O	F	F	F							F	F	F	S	F	F
ME	F	F	F	S		F		F	F	F	F	F	F	F	F	F	F	F
DAM			F	F			F				F	F	S	S		F		O
BJE	F	F					F		F	F	F	S	F	F	F	F	F	F
BJW														U	U	F	F	F
BBR													F	F	F	F	F	O
BEA														U	U		F	
TEN														U	U	S	F	F
LAN	F	F	O	O	O	O	O	O	O	O	O			U	U	F	F	F
WEL					F	F	O	F	O	F	F		F	U	U	F	F	F
HO1							F	F	F	F	S		F	U	U	F	F	F
HO2																	F	
MAL							F	F	F	F			F	U	U	F	F	F
CD																F	F	F
DAY																F		
1P																	F	F
DOX													F			F		F
FA		F	F	F	F	F	F	F	F	F	F	F	U			F	F	F

#F	4	5	3	4	2	4	5	5	5	6	6	4	8	5?	4?	15	15	13
#O			2	1	1	1	2	1	2	1	1							2

F - Pair of Prairie Falcons on territory

S - A single Prairie Falcon on territory

O - Pair of Great Horned Owls nesting in the territory

Summary Table 5.

**Manipulations Due to Flooding**

	Territories		Manipulation		Results
	# Flooded	# Occupied	Eggs Fostered	Young Fostered	Fledged
Prairie Falcon	5	2	4	3	6
Great Horned Owl	2	2		4	5
Red-tailed Hawk	2	2	3	1	2







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